

BUREAU OF INDIAN STANDARDS

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भारतीय मानक मसौदा

परीक्षण पद्धतियाँ — फिनोलिक मोल्डिंग सामग्री

(IS 867 का दूसरा पुनरीक्षण)

Draft Indian Standard

METHODS OF TEST — PHENOLIC MOULDING MATERIALS

(Second Revision of IS 867)

(ICS 83.080.10)

Methods of Sampling and Test for Plastics
Sectional Committee, PCD 27

Last date for receipt of comment is
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FOREWORD

(Formal clauses to be added later)

This standard was originally published in two parts as IS 867 (Part 1) and IS 867 (Part 2) in 1956 and 1959 respectively. The Committee in 1963 decided to amalgamate both the standards as a composite standard laying down methods of sampling of all thermosetting materials would be more useful.

This revision has been brought out to update the test methods for different parameters as separate Indian Standards are already published for these parameters.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

1 SCOPE

This standard prescribes the methods of sampling and test for phenolic moulding materials. The tests covered are for determining apparent density, density of moulding and bulk factor, time of flow, shrinkage of moulding, tensile strength, impact strength, cross-breaking strength, water absorption, acetone soluble matter before and after moulding, free phenols, free ammonia and ammonium compounds, temperature of deflection under load, plastic yield, electric strength, surface resistivity after immersion in water, volume resistivity and power factor and permittivity.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2828 and the following shall apply.

3.1 Cross-Breaking Strength — The empirical maximum stress in a beam at failure in bend. It is numerically equal to maximum bending moment at failure divided by modulus of section, but the calculated value does not represent the true maximum surface stress as the method of calculation holds good only for an ideal elastic solid.

3.2 Curing Time — In the process of moulding, it is the interval of time from the instant the full pressure is shown on the gauge to the instant the pressure is released.

3.3 Density of Moulding — The weight of a unit volume of the moulded material without inserts.

3.4 Electric Strength — The maximum voltage which the test specimen withstands for a specified period of time without breakdown (per millimetre thickness of the specimen).

3.5 Moulding Material (Phenolic) — The uncured composition, containing thermosetting phenolic synthetic resins, various fillers and other ingredients, which becomes hard, infusible and insoluble (that is, cured) by the application of heat and pressure. The material may be in powder, flake or granular form or these forms compressed to pellets, tablets or preforms.

3.6 Plastic Yield — Non-elastic deformation of a beam at a given temperature under a given load.

3.7 Power Factor — The ratio of power loss, in watts, of a capacitor, the dielectric of which consists entirely of the material under test, to the applied apparent power, in volt amperes.

3.8 Shrinkage of Moulding — The difference in dimensions, expressed in thousandth of millimetres per millimetre, between a moulding and the mould cavity in which it is moulded, both the mould and the moulding being at normal room temperature when measured.

3.9 Synthetic Resin (Phenolic) — A resin produced by the condensation of phenols with aldehydes.

3.10 Time of Flow — The time in seconds taken in moulding the material under prescribed conditions.

3.11 Volume Resistivity — The electrical resistance of a unit volume of one-centimetre cube measured between the opposite faces.

4 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 13360 (Part 2/Sec 10) and IS 13360 (Part 2/Sec 11).

5 QUALITY OF REAGENTS

Unless otherwise specified, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

6 TEST METHODS

For the measurement of properties given in col (2) of Table 1, the methods given in col (3) of Table 1 shall be used.

Table 1
(Clause 6)

SI No.	Properties	Methods of Test, Ref to IS/Annex
(1)	(2)	(3)
i.	Apparent density	IS 13360 (Part 3/Sec 2)
ii.	Density of moulding	IS 13360 (Part 3/Sec 10) / IS 13360 (Part 3/Sec 11) / IS 13360 (Part 3/Sec 12)
iii.	Bulk factor	IS 13360 (Part 3/Sec 4)
iv.	Time of flow	IS 13360 (Part 4/Sec 2)
v.	Shrinkage of moulding	IS 13360 (Part 3/Sec 5)
vi.	Tensile strength	IS 13360 (Part 5/Sec 1)
vii.	Impact strength	IS 13360 (Part 5/Sec 4)
viii.	Cross-breaking strength	Annex B
ix.	Water absorption	IS 13360 (Part 8/Sec 1)
x.	Acetone soluble matter before moulding	IS 13360 (Part 10/Sec 7)
xi.	Acetone soluble matter after moulding	Annex C
xii.	Free phenols	IS 13360 (Part 10/Sec 5)
xiii.	Free ammonia and ammonium compounds	IS 13360 (Part 10/Sec 6)
xiv.	Temperature of deflection under load	IS 13360 (Part 6/Sec 3)
xv.	Plastic yield	Annex D
xvi.	Electric strength	Annex E
xvii.	Surface resistivity after immersion in water	Annex F
xviii.	Volume resistivity	Annex G
xix.	Power factor and permittivity at a frequency of one megacycle per second	Annex H

ANNEX A
(Clause 2)
LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 170 : 2020	Acetone — Specification (<i>fifth revision</i>)
IS 335 : 2018	New insulating oils — Specification (<i>fifth revision</i>)
IS 1070 : 2023	Reagent grade water — Specification (<i>fourth revision</i>)
IS 1998 : 1962	Methods of test for thermosetting synthetic resin bonded laminated sheets
IS 2828 : 2019/ISO 472 : 2013	Plastics — Vocabulary (<i>second revision</i>)
IS 13360 (Part 2/Sec 10) : 2006/ISO 10724-1 : 1998	Plastics — Methods of testing: Part 2 Sampling and preparation of test specimens Section 10 Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — General principles and moulding of multipurpose test specimens
IS 13360 (Part 2/Sec 11) : 2006/ISO 10724-2 : 1998	Plastics — Methods of testing: Part 2 Sampling and preparation of test specimens Section 11 Injection moulding of test specimens of thermosetting powder moulding compounds (PMCs) — Small plates
IS 13360 (Part 3/Sec 2) : 1997/ISO 60 : 1977	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 2 Determination of apparent density of material that can be poured from a specified funnel
IS 13360 (Part 3/Sec 4) : 1995	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 4 Determination of bulk factor of moulding materials
IS 13360 (Part 3/Sec 5) : 2013/ISO 2577 : 2007	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 5 Thermosetting moulding materials — Determination of shrinkage (<i>first revision</i>)
IS 13360 (Part 3/Sec 10) : 2021/ISO 1183-1 : 2019	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 10 Determination of density of non-cellular plastics — Immersion method, liquid pyknometer method and titration method (<i>first revision</i>)
IS 13360 (Part 3/Sec 11) : 2021/ISO 1183-2 : 2019	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 11 Determination of density of non-cellular plastics — Density gradient column method (<i>first revision</i>)
IS 13360 (Part 3/Sec 12) : 2016/ISO 1183-3 : 1999	Plastics — Methods of testing: Part 3 Physical and dimensional properties Section 12 Determination of density of non-cellular plastics — Gas pyknometer method

- IS 13360 (Part 4/Sec 2) : 1999 : Plastics — Methods of testing: Part 4 Rheological properties Section 2 Cup flow of phenolic and alkyd moulding materials
- IS 13360 (Part 5/Sec 1) : 2021/ISO 527-1 : 2019 : Plastics — Methods of testing: Part 5 Mechanical properties, Section 1 Determination of tensile properties - General requirements (*second revision*)
- IS 13360 (Part 5/Sec 4) : 2021/ISO 180 : 2019 : Plastics — Methods of testing: Part 5 Mechanical properties Section 4 Determination of izod impact strength (*second revision*)
- IS 13360 (Part 6/Sec 3) : 2022/ISO 75-1 : 2020 : Plastics — Method of testing: Part 6 Thermal properties Section 3 Determination of temperature of deflection under load — General test method (*third revision*)
- IS 13360 (Part 8/Sec 1) : 2022/ISO 62 : 2008 : Plastics — Methods of testing: Part 8 Permanence/Chemical properties Section 1 Determination of water absorption (*first revision*)
- IS 13360 (Part 10/Sec 5) : 2004/ISO 119 : 1977 : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 5 Phenol-formaldehyde mouldings — Determination of free phenols — Iodometric method
- IS 13360 (Part 10/Sec 6) : 2004/ISO 120 : 1977 : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 6 Phenol-formaldehyde mouldings — Determination of free ammonia and ammonium compounds — Colorimetric comparison method
- IS 13360 (Part 10/Sec 7) : 2004/ISO 308 : 1994 : Plastics — Methods of testing: Part 10 Resin (Thermosetting properties) Section 7 Phenol-formaldehyde mouldings — Determination of acetone-soluble matter (Apparent resin content of material in the unmoulded state)

ANNEX B
[Table 1, Sl No. (viii)]
CROSS-BREAKING STRENGTH

B-1 Carry out the determination on three test specimens prepared from the same test sample material.

B-2 PREPARATION OF TEST SPECIMENS

B-2.1 The specimens shall consist of moulded rectangular bars of minimum length 115 mm (or 4.5 in), width (12.7 ± 0.2) mm [or (0.500 ± 0.010) in] and thickness (9.50 ± 0.25) mm [or (0.375 ± 0.010) in].

B-2.2 Mould the specimens in a flash, a positive or a semi-positive mould with a moulding pressure of 150 kg/cm^2 to 450 kg/cm^2 (or 1 ton/in^2 to 3 ton/in^2) and a mould temperature of $155 \text{ }^\circ\text{C}$ to $170 \text{ }^\circ\text{C}$. Apply the moulding pressure in a direction perpendicular to the largest face of the specimens. If desired, pre-heat the material before loading into the mould. Do not allow the curing time to exceed 8 min, but a shorter time may be used provided the specimens are properly cured. If found necessary, chill the mould before ejection of the mouldings. Cool the specimens to room temperature. Condition the specimens as prescribed in IS 13360 (Part 5/Sec 1) and test within 24 h of moulding.

B-3 PROCEDURE

Determine the mean width and the mean thickness of each specimen. Place the specimen symmetrically across parallel V-shaped supports, the distance between the supporting edges being 100.0 mm to 102.0 mm. Apply a load squarely across the width of the specimen by means of a third V-shaped block parallel to and midway between the supporting blocks. The contact edges of the supporting blocks and the block applying the load shall have a radius of approximately 1.6 mm (or 1/16 in). Increase the load steadily so that the specimen fractures in 15 s to 45 s. Note the load in kilograms at failure.

B-4 CALCULATION

$$\text{Cross-breaking strength (kg/cm}^2\text{)} = \frac{1.5WL}{B D^2}$$

where

- W = load in kg at failure;
- L = distance in cm between supports;
- B = mean width in cm of specimen; and
- D = mean thickness in cm of specimen.

B-5 REPORT

The mean of the three determinations shall be taken as the representative value of the cross-breaking strength of the test sample material.

ANNEX C
[Table 1, Sl No. (xi)]
ACETONE SOLUBLE MATTER AFTER MOULDING

C-1 Carry out the determination in duplicate.

C-2 REAGENT

C-2.1 Acetone — Conforming to IS 170

C-3 PREPARATION OF SAMPLE

Obtain drillings, filings, shavings or the like from a moulding prepared as prescribed in IS 13360 (Part 3/Sec 5) except that the moulding of the specimen shall be done for 8 min, taking care that during this breaking process no undue heating of the material occurs. Avoid contamination of the material with foreign matter. Take the portion of the material which passes through a 425 micron IS Sieve but is retained on a 250 micron IS Sieve. Immediately after sieving, place the ground material in an air-tight container to prevent any absorption of moisture.

C-4 PROCEDURE

Weigh to the nearest milligram about 3 g of the sample into a tared open-texture quantitative filter paper or a single thickness extraction thimble. Fold over the thimble or filter paper containing the sample in such a manner that none of the material may float out. Place it in the siphon of any of the extraction apparatus specified in IS 13360 (Part 10/Sec 7). Fit the condenser, siphon tube and flask together and add 50 ml of acetone. Regulate the heating so that siphoning takes place at the rate of 20 times per hour to 30 times per hour. Continue the extraction for 6 h. At the end of this time, remove the flask and pour the acetone extract into a dish or into a smaller flask which has been weighed to the nearest milligram. Wash the flask from which the contents have been poured with about 20 ml of acetone and add the washings to the extract. Evaporate the acetone by any convenient means, care being taken that the temperature does not exceed 50 °C. Place the dish or flask containing the residue in a well-ventilated oven at (50 ± 2) °C for 30 min, cool in a desiccator and weigh. Repeat the process of heating, cooling and weighing until the weight is constant to within 3 milligrams.

C-5 CALCULATION

$$\text{Acetone soluble matter after moulding, percent by weight} = 100 \frac{w}{W}$$

where

w = weight in g of the residue obtained; and
 W = weight in g of the sample taken for the test.

C-6 REPORT

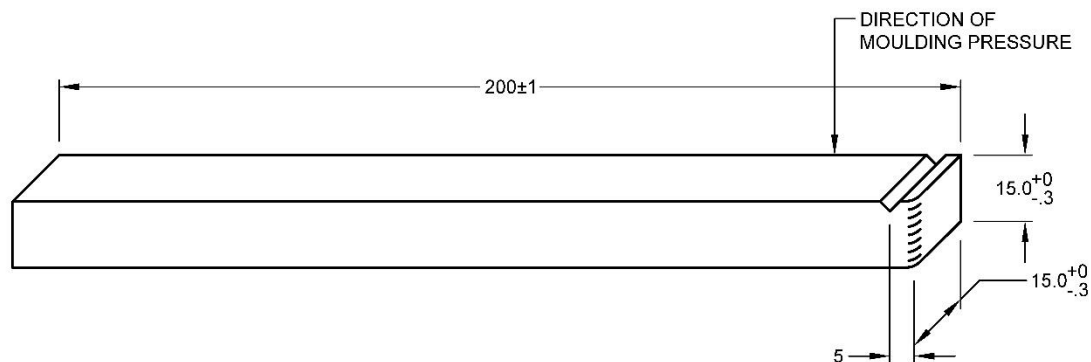
The mean of the two determinations shall be taken as the representative value of acetone soluble matter after moulding of the test sample material.

ANNEX D [Table 1, Sl No. (xv)] PLASTIC YIELD

D-1 Carry out the determination on two test specimens prepared from the same test sample material.

D-2 PREPARATION OF TEST SPECIMENS

D-2.1 The test specimens shall conform to the dimension shown in Fig. 1.



All dimensions in millimetres

FIG. 1 SPECIMEN FOR PLASTIC YIELD TEST

D-2.2 Mould the specimens in a flash, a positive or a semi-positive mould, with a moulding pressure of 150 kg/cm^2 to 450 kg/cm^2 (or 1 ton/in^2 to 3 ton/in^2) and a mould temperature of $155 \text{ }^\circ\text{C}$ to $170 \text{ }^\circ\text{C}$, the direction of moulding pressure being as shown in Fig. 1. If desired, pre-heat the material before loading into the mould. Do not allow the curing time to exceed 15 min; but a shorter curing time may be used provided the specimens are properly cured. If found necessary, chill the mould before ejection of the moulding. Cool the specimens to room temperature and test within 24 h of moulding.

D-3 PROCEDURE

D-3.1 Carry out the test in an oven maintained within ± 2 °C of the temperature specified in the individual standard for the moulding material. Fix the specimen in a rigid manner in the oven by means of a clamp as shown in Fig. 2, and suspend a suitable stirrup with a rigid knife-edge, carrying an attachment for supporting the weight from the notch in the unsupported end of the specimen. Do not allow the weight of the stirrup and attachment to exceed 20 g.

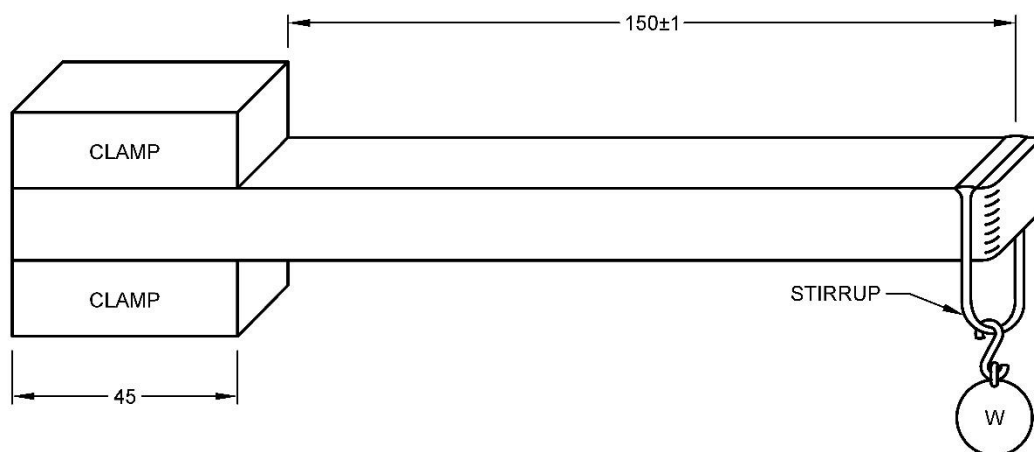
D-3.2 Fifteen minutes after placing the specimen in the oven, measure the height of the unsupported end of the specimen with reference to a suitable datum point in millimetres to an accuracy of 0.1 mm in such a manner that the temperature of the oven does not fall below the specified limit while the measurement is being taken. Then attach a weight to the stirrup so that the total load, including the stirrup, applied to the specimen is (450 ± 1) g. Maintain the specimen in the oven under these conditions for $6 \text{ h} \pm 10 \text{ min}$. At the end of this period, again measure the height of the unsupported end of the specimen, with reference to the datum point, while the specimen is still under the test conditions of load and temperature.

D-4 CALCULATION

Record the difference between the initial and the final measurements and express in millimetres as the plastic yield of the specimen at the specified temperature.

D-5 REPORT

The mean of the two determinations shall be taken as the representative value of plastic yield for the test sample material.



All dimensions in millimetres

FIG. 2 ARRANGEMENT OF SPECIMEN FOR PLASTIC YIELD TEST

ANNEX E
[Table 1, Sl No. (xvi)]
ELECTRIC STRENGTH

E-1 Carry out the determination on at least four test specimens prepared from the same test sample material. One of these specimens shall be used only to provide a preliminary estimate of the approximate value of the voltage at which the test specimens are likely to fail.

E-2 APPARATUS

E-2.1 Electrodes

The bottom electrode shall consist of a solid cylinder of brass 80 mm (or 3 in) in diameter and 25 mm (or one inch) in thickness. The upper electrode shall consist of a solid cylinder of brass 40 mm (or 1.5 in) in diameter and 40 mm (or 1.5 in) in thickness. The sharp edges of the electrodes shall be rounded to a radius not exceeding one millimetre (or 0.04 in). The test faces shall be kept smooth and polished and free from pitting. The electrodes shall be held truly coaxial while testing.

E-2.2 Testing Transformer

Alternative voltage, approximately of the sine wave form and of 50 cycles per second frequency, shall be used. The wave form of the test voltage shall not vary by more than ± 5 percent from a pure sine wave (that is, the crest factor shall be within 1.343 to 1.484). The rms value of the applied voltage shall be determined from the readings of a peak voltmeter suitably connected to the output side of the transformer. For this purpose, the wave form shall be deemed to be sinusoidal. (The 'rms value' may also be determined by an electrostatic voltmeter connected to the output side or even by an ordinary AC voltmeter connected to the input side or to a tertiary coil, provided that this voltmeter has been properly calibrated against a sphere gap connected to the output side.) The capacity of the transformer shall be sufficient to maintain the full test voltage on the specimen for the maximum time required for the test. A rating of 2 kVA to 5 kVA depending upon the output voltage shall normally be considered sufficient. The transformer circuit should be protected from excessive current by a circuit-breaker on breakdown of the test specimen.

E-2.3 Voltage Control — Control of voltage may be secured by using one of the following devices:

- a) Variable ratio auto-transformer;
- b) Induction regulator;
- c) Generator field regulator (for separate alternator); and
- d) Resistance potential divider.

E-3 PREPARATION OF TEST SPECIMENS

E-3.1 The specimens shall be moulded discs not less than 100 mm (or 4.00 in) in diameter and (3.0 ± 0.2) mm [or (0.125 ± 0.010) in] thick. The specimens shall be flat.

E-3.2 Mould the specimens in a flash, a positive or a semi-positive mould, with a moulding pressure of 150 kg/cm^2 to 450 kg/cm^2 (or 1 ton/in^2 to 3 ton/in^2) and a mould temperature of $155 \text{ }^\circ\text{C}$ to $170 \text{ }^\circ\text{C}$. If desired, pre-heat the material before loading into the mould. Do not allow the curing time to exceed 6 min; but less time may be used provided the specimens are properly cured. If found necessary, chill the mould before ejection of the moulding. Cool the specimens to room temperature and test within 24 h of moulding.

E-4 CONDITIONING

Keep the specimens for at least 5 h in a desiccator over anhydrous calcium chloride at room temperature prior to testing.

E-5 PROCEDURE

E-5.1 Immerse the four specimens and the electrodes for 15 min to 25 min in a suitable bath of insulating oil (conforming to IS 335) maintained at $(90 \pm 2) \text{ }^\circ\text{C}$. At the end of this time, apply a voltage to one specimen mounted symmetrically between the electrodes as shown in Fig. 3 and increase it uniformly at about 30 kV per minute until breakdown occurs. Treat this as a preliminary estimate of the approximate value of the voltage at which other specimens are likely to fail. Mount the remaining 3 specimens in turn between the electrodes and apply a voltage equal approximately to half the breakdown voltage of the first specimen and maintain for 20 s. If the specimen withstands this voltage without failure, raise the test voltage in steps of 1 kV up to 25 kV and thereafter in steps of 2 kV.

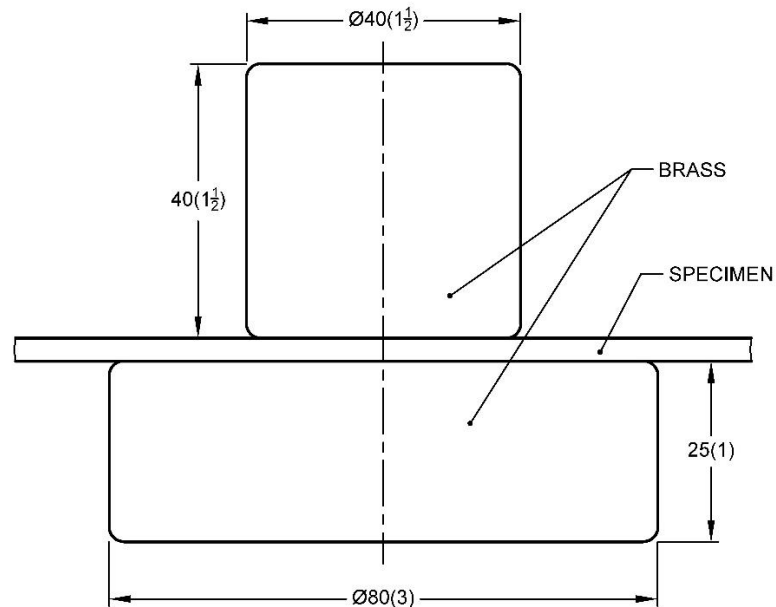
E-5.2 Maintain each test voltage for 20 s unless failure occurs. If the second or any subsequent specimens fail in less than 20 s after the commencement of testing, disregard the test and repeat it on a fresh specimen, the initially applied voltage stress being approximately one fourth of the breakdown voltage of the first specimen in this case.

E-6 CALCULATION

The electric strength of the specimen shall be the maximum voltage which the specimen withstands for 20 s without breakdown, divided by the thickness of the specimen in millimetres (or thousandths of an inch) measured near the point of breakdown.

E-7 REPORT

The mean of the three determinations (other than the first and the subsequent disregarded ones) shall be taken as the representative value of electric strength for the test sample material.



All dimensions in millimetres with inch equivalents in parentheses

FIG. 3 ARRANGEMENT OF ELECTRODES FOR ELECTRIC STRENGTH TEST

ANNEX F

[Table 1, Sl No. (xvii)]

SURFACE RESISTIVITY AFTER IMMERSION IN WATER

F-1 Carry out the determination on at least two test specimens prepared from the same test sample material.

F-2 APPARATUS

Electrodes as shown in Fig. 4 and electric circuit as shown in Fig. 5 are suitable for measuring surface resistivity.

F-3 PREPARATION OF TEST SPECIMENS

The test specimens shall be prepared as prescribed in E-3.

F-4 CONDITIONING

Immediately after the specimen has cooled to room temperature immerse it for (24.0 ± 0.5) h in water at a temperature of (27 ± 2) °C. Take out the specimens from water and remove all surface moisture by pressing with dry blotting or filter paper.

F-5 PROCEDURE

Measure the surface resistance of each specimen at (27 ± 5) °C in 10 min to 15 min from the time of its removal from water. The relative humidity of the laboratory atmosphere at the time of test shall not exceed 75 percent. The surface resistance between the electrodes shall be measured one minute after the application of electrical pressure at (500 ± 50) V DC.

F-6 CALCULATION

$$\text{Surface resistivity (ohms)} = \log_{10} \left\{ \frac{2\pi S}{\log_e \frac{D}{d}} \right\}$$

where

S = surface resistance in ohms;

D = internal diameter in mm of upper outer electrode; and

d = internal diameter in mm of upper inner electrode.

NOTE — For the apparatus shown in Fig. 4, surface resistivity \log_{10} ohms = \log_{10} 18.7 S .

F-7 REPORT

The mean of the two determinations shall be taken as the representative value of surface resistivity for the test sample material.

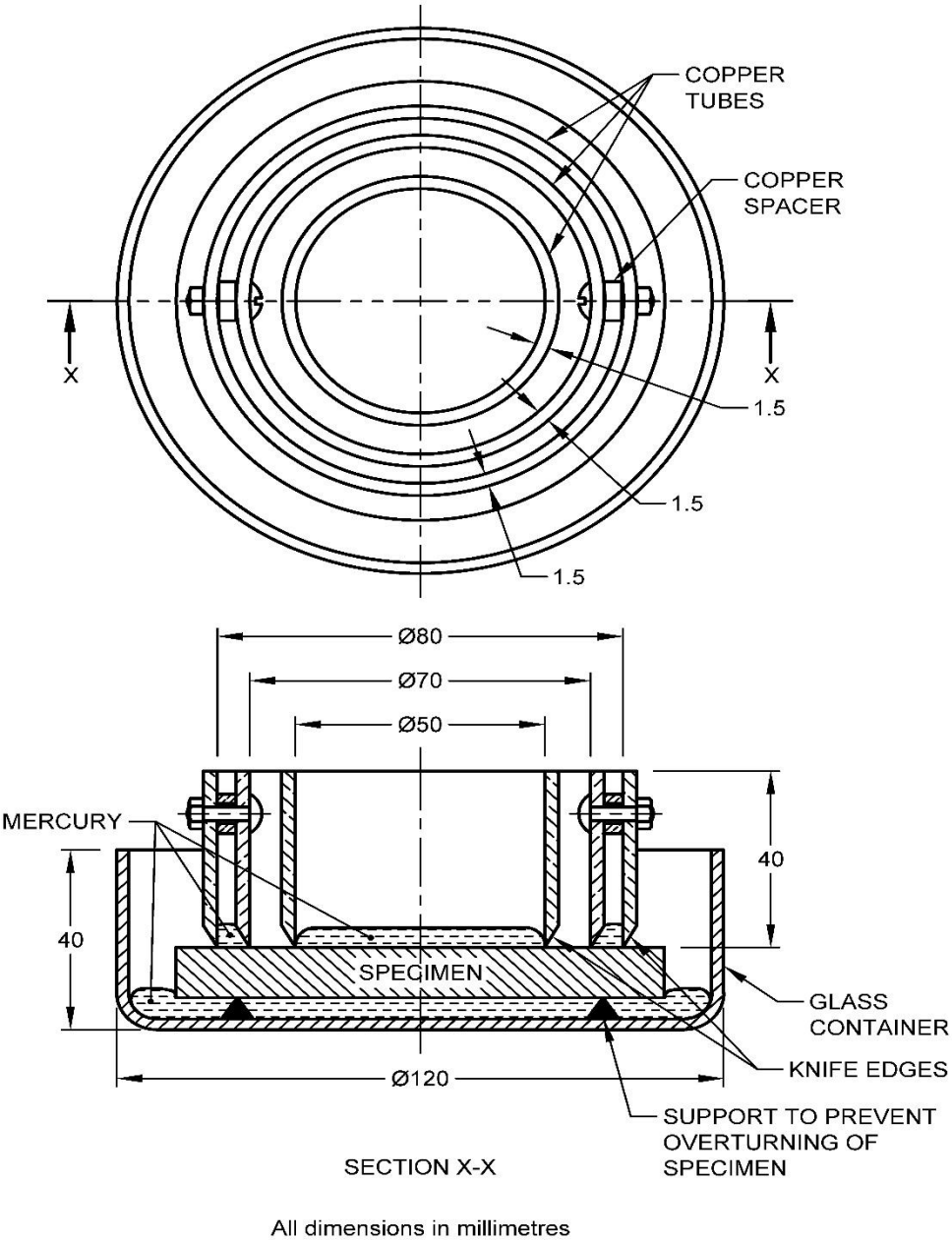


FIG. 4 DETAILS OF ELECTRODES FOR SURFACE AND VOLUME RESISTIVITY TESTS

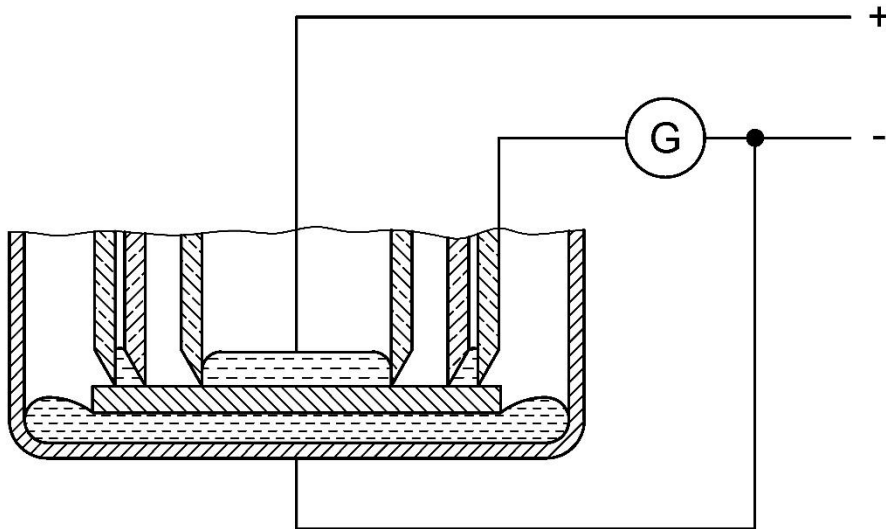


FIG. 5 CIRCUIT FOR SURFACE RESISTIVITY TEST

ANNEX G
[Table 1, Sl No. (xviii)]
VOLUME RESISTIVITY

G-1 Carry out the determination on at least two test specimens prepared from the same test sample material.

G-2 APPARATUS

Electrodes shown in Fig. 4 and electric circuit shown in Fig. 6 are suitable for measuring volume resistivity.

G-3 PREPARATION OF TEST SPECIMENS

G-3.1 The test specimens shall be moulded discs not less than 100 mm (or 4.00 in) in diameter and (3.0 ± 0.2) mm [or (0.125 ± 0.010) in] thick. The specimens shall be flat.

G-3.2 Mould the specimens in a flash, a positive or a semi-positive mould, with a moulding pressure of 150 kg/cm^2 to 450 kg/cm^2 (or 1 ton/in^2 to 3 ton/in^2) and a mould temperature of $155 \text{ }^\circ\text{C}$ to $170 \text{ }^\circ\text{C}$. Do not pre-heat the moulding material before loading into the mould and do not allow the mould to breathe. Do not allow the curing time to exceed 6 min; but less time may be used provided the specimens are properly cured. If found necessary, chill the mould before ejection of the mouldings. Cool the specimens to room temperature and test within 24 h of moulding.

G-4 PROCEDURE

Measure the volume resistance of each specimen at $(27 \pm 5)^\circ\text{C}$ between the electrodes, one minute after the application of electrical pressure at a potential difference of (500 ± 50) volts DC.

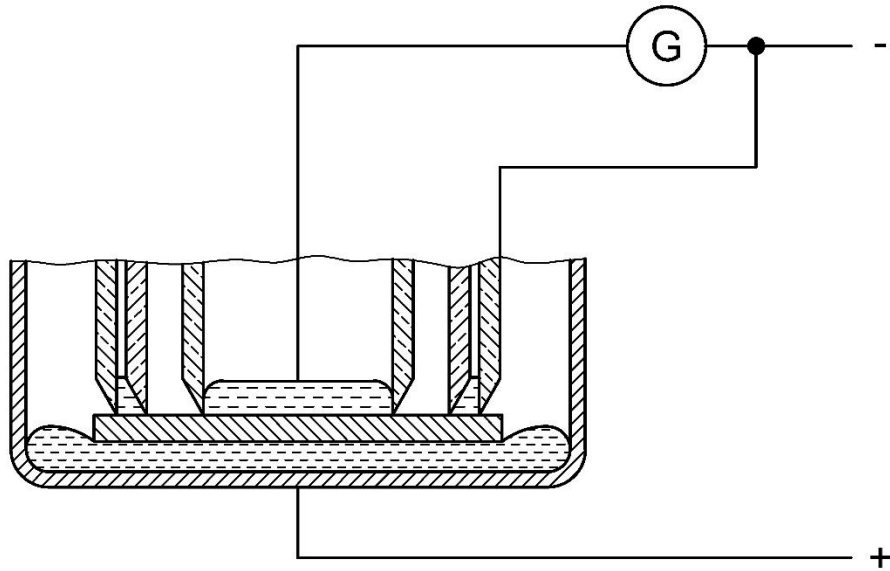


FIG. 6 CIRCUIT FOR VOLUME RESISTIVITY TEST

G-5 CALCULATION

$$\text{Volume resistivity (log}_{10} \text{ ohm.cm)} = \log_{10} \frac{AR}{t}$$

where

A = area in cm^2 of upper electrode (19.6 cm^2 of upper electrode shown in Fig. 4);

R = resistance in ohms between the upper and the lower electrodes; and

t = thickness in cm of the specimen.

G-6 REPORT

The mean of the two determinations shall be taken as the representative value of volume resistivity for the test sample material.

ANNEX H

[Table 1, Sl No. (xix)]

POWER FACTOR AND PERMITTIVITY AT A FREQUENCY OF ONE MEGACYCLE PER SECOND

H-1 Carry out the determination on at least two test specimens prepared from the same test sample material.

H-2 PREPARATION OF TEST SPECIMENS

H-2.1 The specimens shall be moulded discs (50 ± 1) mm [or (2.00 ± 0.04) in] in diameter and 1.5 mm to 3.2 mm (or 1/16 in to 1/8 in) thick.

H-2.2 The specimens shall be flat and the thickness at any point shall not vary from the average thickness by an amount exceeding 0.025 mm (or 0.001 in). It is permissible to grind or otherwise machine the specimen in order to comply with these requirements.

H-2.3 Mould the specimens in a flash, a positive or a semi-positive mould, with a moulding pressure of 150 kg/cm² to 450 kg/cm² (or 1 ton/in² to 3 ton/in²) and a mould temperature of 155 °C to 170 °C. If desired, preheat the material before loading into the mould. Do not allow the curing time to exceed 5 min; but less time may be used provided the specimens are properly cured. If found necessary, chill the mould before ejection of the moulding. Cool to room temperature in a desiccator. Test the specimens within 24 h of moulding.

H-3 PROCEDURE

Measure the power factor and permittivity of the specimens at (27 ± 5) °C by the method prescribed for determination of power factor and permittivity in IS 1998 or by any other method which gives the same results.

H-4 REPORT

The mean of the two determinations of power factor and permittivity shall be taken as the representative values for power factor and permittivity for the test sample material.